

North Coast Regional Water Board

During the first five years of the Surface Water Ambient Monitoring Program (SWAMP), the North Coast Regional Water Board focused on funding monitoring in each of our 6 watershed management areas. We established 80 rotating stations and 29 long-term trend monitoring stations on 49 rivers and streams throughout the North Coast Region. Due to funding constraints, we have spent most of our funding allocation on monitoring wadeable streams and large rivers, relying upon water column chemistry to assess whether the aquatic life beneficial use is supported. An [interpretive report](#) on this data is available through the State Water Board website.

Our Regional SWAMP efforts were initially coordinated to provide information to the North Coast Watershed Assessment Program and the Total Maximum Daily Load program as well as to provide information to managers and decision makers where limited or no data was previously available. These efforts provide almost all of the Regional ambient monitoring data that we use to assess the general health and condition of our waters. SWAMP data have proven to be especially valuable for assessing the many unpopulated areas of the Region where other entities are not actively monitoring. We also are using these data to prepare the 303(d) and 305(b) Integrated Water Quality Assessment Report. Over 60% of the “Lines of Evidence” used to evaluate the North Coast waterbodies for the Integrated Water Quality Assessment Report were based on Regional SWAMP data.

In addition, the North Coast Regional Water Board utilized SWAMP funding to investigate MTBE concentrations in two North Coast lakes and to conduct a screening study of estrogenic endocrine disrupting



chemicals in two major rivers in the North Coast in conjunction with the Central Valley Water Regional Board.

Currently we are involved with the development of the Klamath River Water Quality Monitoring Group, a regional monitoring program comprised of members from Federal, State, County, Tribal agencies, and local non-governmental organizations. We also provide training, staff time, and equipment to local and Tribal entities throughout the Region to increase their involvement in data collection, analysis, and assessment.

The North Coast Regional Water Board is re-evaluating the direction of our Regional SWAMP efforts for fiscal year 2010-2011. We are evaluating all of the data collected to date by SWAMP and other entities to determine where additional information is needed and where additional investigations are warranted.



San Francisco Bay Regional Water Board

During the first five years of SWAMP, the San Francisco Bay Regional Water Board's program focused on monitoring watersheds throughout the region on a rotating basis and conducting studies to measure the concentrations of contaminants in fish caught and consumed by fishers in places other than San Francisco Bay. Since the San Francisco Estuary Regional Monitoring Program (RMP) conducts comprehensive monitoring in San Francisco Bay, we decided to concentrate our limited resources on evaluating whether the beneficial use of aquatic life was protected in wadeable streams and whether it was safe to consume fish from water bodies other than San Francisco Bay. A description of the San Francisco Bay Region, as well as our regional SWAMP activity, monitoring goals and vision, and collaborative efforts are available in our [regional fact sheet](#).

To assess whether aquatic life was protected in wadeable streams, we used a suite of indicators including bioassessments, physical habitat assessments, continuous basic water quality monitoring, water column chemistry and toxicity, and sediment chemistry and toxicity. In five years of monitoring we assessed whether aquatic life was protected in 34 wadeable streams. Three [interpretive reports](#) on the water quality condition of these streams can be found on the Regional Water Board SWAMP website. We also developed a trash assessment method, used this method to assess trash at 26 sites, in 14 water bodies, and documented this information in a [technical report](#).

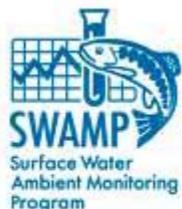
To assess whether it is safe to eat the fish, we conducted studies measuring contaminants in fish in Tomales Bay, along the San Mateo coast and in 10 lakes in the Region. A [report](#) interpreting the data is



available online. To better inform the public of potential risks associated with eating fish from these reservoirs, we formed a committee consisting of the Office of Environmental Health Hazard Assessment (OEHHA), the California Department of Public Health, county environmental health departments, East Bay Regional Parks and other responsible parties to develop advisories for consuming fish, translating advisories in to several languages, and developing signs and other materials for education and outreach. In subsequent years, we collected additional data so that OEHHA could refine fish advisories for the lakes we sampled. All of the creek and fish data collected over this 5-year period was used in the 2006 and 2008 water quality assessment process and resulted in a total of 30 water bodies being listed as impaired.

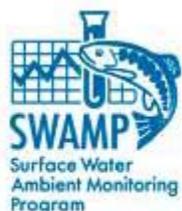
In 2008 we modified our SWAMP strategy based on needs identified during previous monitoring and on funding constraints. Our current strategy is to monitor water quality conditions and biotic assemblages, and the spatial and temporal variability of those conditions, at minimally disturbed reference sites and at urban sites that represent “best attainable” conditions. Our new [peer reviewed design](#) is available online. The purpose of this monitoring is to: 1) provide context for future watershed monitoring that will be conducted by storm water programs and watershed monitoring groups; 2) collect data that can be used for developing bioassessment protocols, indices of biological integrity, biological objectives and nutrient criteria; and 3) identify long-term trends associated with climate change.

In addition to the studies conducted by the regional program, the San Francisco Bay Regional Water Board SWAMP spends significant staff resources coordinating monitoring in the region. This provides an opportunity to leverage SWAMP funding and to form coalitions that can provide consistent water quality information targeted at answering specific water quality management questions, while maximizing efficient use of resources. To develop information on water quality in the San Francisco Estuary, SWAMP staff has been integral to the establishment and development of the San Francisco Estuary [Regional Monitoring Program](#) (RMP). The RMP is a world-class water quality monitoring program targeted at the highest priority questions faced by the San Francisco Bay Water Board and the regulated community.



Currently, the RMP is working collaboratively with SWAMP to monitor contaminants in fish in bays and estuaries of the state.

SWAMP staff has been working with a coalition of programs that collect bioassessment data, the Bay Area Macroinvertebrate Bioassessment Information Network (BAMBI_{net}), to further develop information on water quality in wadable streams. BAMBI_{net} meets to: 1) discuss and standardize bioassessment data, 2) input all regional bioassessment data in to one database, and 3) analyze regional data for the purpose of developing a Bay area Index of Biotic Integrity (IBI). Regional SWAMP staff also is working with storm water programs, as an outgrowth of the regional MS4 permit, to develop a watershed monitoring coalition so that watershed monitoring will be coordinated throughout the region and with SWAMP statewide. Regional SWAMP staff also plays an advisory role in TMDL monitoring, NPDES mandated monitoring and volunteer monitoring in order to provide consistency, enhance coordination and foster a comprehensive approach to water quality monitoring in the region.



SWAMP Monitoring Strategy

Central Coast Regional Water Board



The Central Coast Regional Water Board has been monitoring the Region's five watershed areas on a rotating basis for ten years, beginning before the initiation of the SWAMP program. The Central Coast Ambient Monitoring Program (CCAMP) has monitored approximately 30 watershed sites once a month during each rotation year for conventional chemistry and flow. In addition, we monitor 33 of our coastal stream confluences on a continuous monthly basis for detection of trends. We also sample for water and sediment toxicity (twice per year), bioassessment (twice), and on occasionally bioaccumulation.

Data from our basic monitoring program is used for many purposes, including development of Hydrologic Unit assessment reports, enforcement actions, NPDES permit requirements, watershed planning, grants prioritization, evaluation of Basin Plan objectives, and other Water Board staff activities. It also is heavily used by the public, consultants, and other agencies through our [web site](#). CCAMP Hydrologic Unit assessment reports address several basic questions about beneficial use support. These ask whether there is evidence that 1) it is unsafe to swim, 3) it is unsafe to eat the fish, 3) it is unsafe to drink the water, 4) aquatic life uses are not supported, 5) agricultural uses are not supported, and 6) non-contact uses are not supported. The report also makes recommendations for priority action by Water Board staff and others. These reports and other related [publications](#) are available online. CCAMP has conducted an assessment study of all Central Coast harbors, in collaboration with the U.S. EPA assessment of the Morro Bay National Estuary. In this study, harbors were evaluated using a



probabilistic approach for sediment chemistry, sediment toxicity, benthic invertebrate assemblages, water column chemistry and fish and mussel chemistry. This data is summarized in a report on our website.

CCAMP has invested heavily in development of data management and assessment tools. We have made our data available to the public through web site maps and graphs since 2000. We process all of our data electronically, and have developed a web-based batch upload tool that not only moves our own data into SWAMP, but also is being used by the Central Coast Cooperative Monitoring Program for Agriculture and by grants programs to deliver data to us in SWAMP comparable format. This upload tool has been adapted for use by volunteer monitoring groups statewide. We recently developed code that scans our data and data from other monitoring programs in the Region for water quality exceedances and creates “Lines of Evidence” for submittal into the State’s new Water Quality Assessment Database. We have generated over 11,000 Lines of Evidence from this combined data set for integrated water quality assessment and 303(d) listing/delisting support.

CCAMP has leveraged the program considerably by coordinating design of new monitoring efforts with our own program approach. For example, an additional network of 50 long term trend sites are monitored through the Cooperative Monitoring Program for Agriculture, the agriculture industry’s monitoring program to comply with their discharge requirements. This adds considerably to our overall ability to detect change and to understand agricultural impacts in our Region. Our single Phase 1 stormwater permit has a similarly structured monitoring program. Our major Monterey Bay area dischargers coordinated with CCAMP in implementing the Central Coast Long-Term Environmental Assessment Network (CCLEAN). Also, we spent considerable time and resources coordinating data from other monitoring efforts in our Region, including volunteer groups, local agencies, and others.

CCAMP’s second 5-year watershed rotation will be completed in December 2009. We are planning a break in watershed monitoring during 2010, but will maintain our ongoing trend monitoring of coastal confluence sites. We are doing this for several reasons. First, we anticipate reduced funding from both



our private endowment and from SWAMP because of current budget constraints. The next watershed area we need to assess is the Pajaro and North Coast Watershed Area, which is by far our most complex and expensive to monitor, and we want to have sufficient resources to monitor it comprehensively. Second, we plan to spend staff energy on developing a comprehensive assessment of our Region that includes an evaluation of water quality change between the first two rotations. We may adjust our third rotational monitoring strategy based on the outcome of this analysis. Finally, we intend to develop a new online format for assessment reporting, which will require some contracted web assistance.



SWAMP Monitoring Strategy



Los Angeles Regional Water Board

During the first five years of the Surface Water Ambient Monitoring Program (SWAMP), the Los Angeles Regional Water Board focused on funding monitoring in each of our 10 watersheds on a rotating basis. Due to funding constraints, we spent most of our resources on monitoring wadeable streams, relying on a triad of indicators to assess whether the aquatic life beneficial use is being supported (benthic macroinvertebrate community, water column toxicity, water column chemistry). We assessed 6 of the 10 watersheds: Calleguas Creek, Santa Clara River, Santa Monica Bay, Los Angeles River, San Gabriel River, Dominguez Channel. We also monitored a few estuaries (Calleguas Creek, Santa Clara River, Los Angeles River, San Gabriel River), harbors (Los Angeles/Long Beach Harbor, Port Hueneme), and marinas (Ventura Marina, Channel Islands Harbor) and lagoons to assess protection of aquatic life. We were only able to monitor one lake to assess protection of aquatic life (Lake Machado).

Following SWAMP's scientific review, we shifted our strategy to augment statewide SWAMP programs. In 2007, we sampled 32 lakes and reservoirs in the Los Angeles Region in conjunction with the statewide study of contamination in fish from lakes to assess whether it is safe to consume sportfish from these waterbodies. In 2008, we sampled 6 watersheds with the triad of indicators mentioned above in conjunction with the SWAMP Perennial Stream Assessment (PSA) initiated in 2008 and to begin early implementation of the PSA-based design adopted by the Southern California Stormwater Monitoring Coalition (due to begin in 2009). In 2008, we also contributed to the Bight'08 regional monitoring

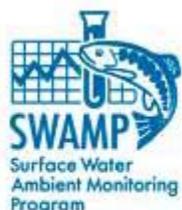


program to survey coastal waters in the Southern California Bight. In 2009, we are sampling in two watersheds (Santa Monica Bay, Santa Clara River) to help implement the Southern California Stormwater Monitoring Coalition watershed monitoring program and we expect to continue this support in 2010 and subsequent years.

In 2009, we contributed funding to augment the SWAMP's study of contamination in sportfish in coastal waters, bays and estuaries to assess whether it is safe to consume sportfish from these waterbodies. We also set aside funds to conduct follow-up work on lakes with high fish tissue contamination levels to provide sufficient data for the Office of Environmental Health Hazard Assessment (OEHHA) to evaluate the need for fish consumption advisories. This monitoring probably will begin in 2010.

In addition to routine SWAMP matters, staff time has been spent on planning activities associated with the periodic regional Bight surveys of coastal waters, bays and estuaries (1998, 2003, 2008) and coordinating development and implementation of watershed-wide monitoring programs (Calleguas Creek, San Gabriel River, Los Angeles River) that integrate NPDES-mandated monitoring, TMDL monitoring, SWAMP monitoring, volunteer monitoring and other efforts into more useful comprehensive monitoring programs with defined objectives.

The Los Angeles Regional Water Board produced reports on SWAMP monitoring for the Santa Clara and Calleguas Creek Watersheds, the Santa Monica Bay Watershed Management Area, the Dominguez Channel/Los Angeles-Long Beach Harbor Watersheds, and the San Gabriel River Watershed. These [reports](#) are available online. A [fact sheet](#) providing an overview of the Los Angeles Region also is available online.



Central Valley Regional Water Board

During the first five years of SWAMP, the Central Valley Regional Water Board coordinated with and built off of existing frameworks within each individual basin (San Joaquin River, Upper and Lower Sacramento River, and Tulare Lake) in order to leverage limited resources. Separate approaches were developed based on each basin's unique characteristics, existing monitoring programs, and water quality issues and can be generalized as follows:

- The upper Sacramento River Basin augmented monitoring efforts by locally directed watershed management partnerships, and was primarily focused on the upper Feather River and Pit River watersheds.
- The lower Sacramento River Basin coordinated monitoring efforts with the Sacramento River Watershed Program and focused on regional priority issues, including estrogenic endocrine disrupting chemicals and pyrethroid pesticides.
- The San Joaquin River Basin expanded the existing framework used in the multi-agency Grassland Bypass selenium control program to accommodate more detailed monitoring of each of five sub-basins on a rotational basis.
- The Tulare Lake Basin focused primarily on watersheds with known water quality impairments, with additional efforts to broaden the scope throughout the basin.

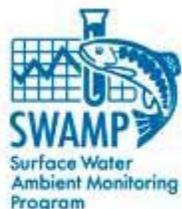
The Central Valley Water Board SWAMP also provided equipment and developed standard operating procedures for staff to perform in-house water sample analyses for total coliform and *E. coli* bacteria.

Following the statewide SWAMP scientific review in 2005, Central Valley Water Board staff re-evaluated the program. The revised focus aims to better coordinate internal monitoring efforts and data assessments (including supporting the region's 303d/305b Integrated Report development), ensure regional efforts are aligned with the statewide strategy and assessment framework, and facilitate a region-wide program. To meet these objectives we initiated region-wide trend monitoring that builds off of 30 Central Valley sites identified by the statewide contaminants trend monitoring. The region-wide effort will allow seasonal evaluation at key sites, more detailed evaluation of the Sacramento, San Joaquin and Tulare Lake Basins on a rotating basis, and a consistent framework for coordination efforts.

Coordination is still a primary goal of the Central Valley Water Board's SWAMP and includes but is not limited to:

- Continued monitoring support for the multi-agency Grassland Bypass Project;
- Staff support for development of the Sacramento-San Joaquin Delta Regional Monitoring Program;
- Development of a web-based monitoring directory to improve internal and external coordination;
- Coordinated trend monitoring with the Department of Water Resources in the upper Sacramento River Basin—focused on measuring ambient water quality at lower watershed integrator sites and linked to the statewide SWAMP contaminant trend monitoring project;
- In coordination with several local watershed groups, monitoring and assessment of bacteria concentrations at popular swimming holes throughout the Central Valley during Labor Day weekends in 2007 and 2008. (Additional money has been set aside to identify sources and specific pathogens at sites with high bacteria.)

Detailed information on the Central Valley Water Board SWAMP, including links to over 35 water quality assessment reports, water quality data for the San Joaquin River Basin, and historic and current program information, is available on the [Central Valley Water Board website](#).



Lahontan Regional Water Board

The [Lahontan Region](#) is unique in that its Water Quality Control Plan (“Basin Plan”) contains numerous site-specific numeric water quality objectives, most of which were adopted in the early 1970s but (prior to SWAMP) never monitored. The Region also is unique in that it has many interstate waters (which flow into the State of Nevada). The primary objectives of SWAMP monitoring at the Lahontan Region are to:

1. Determine whether ambient water quality at selected sites is in compliance with the chemical and physical water quality objectives contained in the Water Quality Control Plan for the Lahontan Region ([Basin Plan](#)) and the “[California Toxics Rule](#)”.
2. Determine (to the extent to which funding is available) whether water flowing from the Lahontan Region into the State of Nevada meets [Nevada’s water quality objectives](#).
3. Develop and implement tools to assess the biological integrity of the Region’s streams and rivers based on instream macroinvertebrate and algae assemblages (i.e., “[bioassessment](#)”).

The available funding has allowed for chemical monitoring at about 30 sites throughout the Region on a quarterly basis. All [data](#) and a [summary report](#) on the first five years of work (i.e., years 2000-05) are available at the Region’s [SWAMP webpage](#).

In addition to ongoing, routine monitoring at the selected sites, the Region’s SWAMP staff spends considerable time on other related tasks, such as: (1) designing and maintaining a [user-friendly website](#)

to make monitoring data and assessment reports accessible to the public; (2) coordinating water and fish monitoring projects with other public agencies and NGOs; (3) testing for contaminants in fish tissue where screening studies indicate potential exceedances of human health thresholds; (4) coordinating bioassessment methods and approaches throughout the State; and (5) other [special projects](#), such as monitoring the success of restoration efforts, developing biological objectives for use in assessing stream health, and assisting Water Board staff and others in using bioassessment techniques.

Due to funding limitations, the quality of many surface waters in the Lahontan Region remains unassessed. As funding allows, the Region would like to conduct additional targeted and probabilistic assessments of the regions 700+ lakes, 3,000+ miles of streams, and numerous wetlands.

Santa Ana Regional Water Board

Since the inception of the Surface Water Ambient Monitoring Program (SWAMP) in 2000, the Santa Ana Regional Water Board focused resources to obtain data in waterbodies that lacked the necessary data to determine compliance with water quality objectives. These waterbodies included Anaheim Bay, Huntington Harbor, Lake Elsinore, and Canyon Lake. In each of these waterbodies, we learned about their seasonal regimes and used the data to refine their status on the Clean Water Act's Section 303(d) list of impaired waterbodies.

Our current strategy is to conduct bioassessment monitoring of rivers and streams in our region using a probabilistic design to identify the percent of streams that score poor on the Southern California Index of Biological Integrity. This monitoring is scheduled to be completed in 2010. We plan to use the findings from this study to identify the areas of concern in our region, which will inform development of waste discharge requirements, conditions of water quality certifications, and staff's comments on environmental documents. In 2009, we also plan to reach out to citizen groups, and non government entities that monitor waterbodies in our region to educate them about quality assurance, sampling and data management protocols, and to establish partnerships.

We are planning to coordinate with and contribute funds to the bioassessment monitoring being coordinated by the Southern California Coastal Water Research Project for the stormwater management agency coalition in Southern California. We also plan to coordinate efforts with current point source dischargers who are



required to monitor receiving waters in the region. All the data will be assessed for the Integrated Water Quality Assessment Report and, where applicable, to update the Clean Water Act Section 303(d) List of the Region's impaired waters.



SWAMP Monitoring Strategy

San Diego Regional Water Board

The SWAMP program in the San Diego region is designed to support and expand water quality assessments of the regions' waterbodies. From 2000-2005, the San Diego Regional Water Board monitored the Region's 11 hydrologic units on a rotating basis. Water chemistry, water and sediment toxicity, benthic macroinvertebrate community, physical habitat, and occasionally tissue contamination, were assessed at multiple targeted sites twice during the dry and wet season. The monitoring was focused on main stem rivers and streams and major tributaries within the hydrologic units. In 2006 and 2007, data from the rotational watershed monitoring were analyzed and [watershed reports](#) were produced for each hydrologic unit by the Southern California Coastal Water Research Project. In addition, data from all 11 hydrologic units were assessed to produce a [synthesis report](#), which was used to evaluate the program. The synthesis report gives four main recommendations for the San Diego Region SWAMP program: (1) Improve integrative and coordinated regional monitoring to increase cost-efficiency; (2) Design a probability based study to address the ecological health of wadeable streams; (3) Use appropriate indicators, and (4) Build an information management system. Beginning in 2008, the SWAMP monitoring design was revised to address all four recommendations. In the next five years, our SWAMP monitoring strategy will include a long-term trend monitoring program, special studies, and the coordination of regional monitoring.

In 2007, the San Diego Regional Water Board's SWAMP focused its efforts on bioassessment studies on reference sites to protect high quality waters and produce information for the development of biological objectives. Sampling for reference sites will continue in



2011. In 2008, targeted sites within all 11 hydrologic units were sampled to compare past data with current conditions and to include algae as additional indicators. Bioassessment data from 2007 and 2008 will be summarized in a report by December 2009, and will be available on the [San Diego Region's SWAMP website](#).

Starting in 2007, the San Diego Region SWAMP coordinator participated in the development of a probability based study in Southern California through the Stormwater Monitoring Coalition (SMC). Starting in spring 2009, we devoted 50% our SWAMP funding to the SMC study to fund monitoring at 11 sites. We plan to continue this support for five years. In addition, SWAMP funds will support the coordination of regional monitoring in the San Diego region to improve regional monitoring and to increase cost-efficiency.

Data from the San Diego Region's SWAMP are disseminated to the public through a Regional Data Portal. Monitoring data from dischargers, non profit organization, and other agencies in the San Diego region also will be included into the data portal. The San Diego Region's SWAMP website will link to the regional data portal.

The San Diego Region's SWAMP has leveraged their funds considerably through collaboration with other agencies and entities conducting monitoring and assessment. We collaborated in a post-fire study in the San Diego region with the CA Department of Fish and Game and CA State University, Chico. Additionally, the SWAMP program collaborates with the Bight '08 Program among several dischargers, other agencies, universities, and several non-profit organizations.

